DOCUMENT RESUME

ED 381 054 HE 028 177

AUTHOR	Pascarella, Ernest T.; And Others
TITLE	What Have We Learned from the First Year of the National Study of Student Learning?
INSTITUTION	National Center on Postsecondary Teaching, Learning, and Assessment, University Park, PA.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	[95]
CONTRACT	R117G10037
NOTE	28p.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Academic Achievement; Black Colleges; Classroom Environment; *Cognitive Development; College Athletics; College Environment; Colleges; *College Students; *Critical Thinking; Fraternities; Higher Education; Longitudinal Studies; *Mathematical Aptitude; Racial Differences; *Reading Comprehension; Sex Differences; Sororities; *Student Development; Teacher Behavior; Two Year Colleges; Universities
IDENTIFIERS	First Generation Students; *National Study of Student Learning

ABSTRACT

This paper presents the results of eight analyses based upon data from the National Study of Student Learning (NSSL), a 3-year longitudinal research project begun in 1992 to examine the influence of academic and nonacademic experiences on student learning, student attitudes about learning, student cognitive development, and student persistence. Eighteen four-year and five two-year postsecondary institutions participated in the study, with data collected from a total of 3,840 students. The eight analyses focused on the effects of:, (1) two- and four-year colleges on cognitive development; (2) historically black and predominantly white colleges on cognitive development; (3) teacher behavior on cognitive development; (4) first-generation college attendance on cognitive development and attitudes; (5) intercollegiate athletic participation on cognitive development; (6) institutional environment and students' academic and nonacademic experiences on students' development of openness to cultural and racial diversity; (7) Greek affiliation on cognitive development during the first year of college; and (8) in-class and out-of-class experiences on first-year students' critical thinking ability. These analyses found little difference in the cognitive gains made by students attending two-year versus four-year institutions, or historically black versus predominantly white institutions. Other results are presented and discussed. (Contains 40 references.) (MDM)

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WHAT HAVE WE LEARNED FROM THE FIRST YEAR OF THE NATIONAL STUDY OF STUDENT LEARNING?*

Ernest T. Pascarella
Elizabeth J. Whitt
Amaury Nora
Marcia Edison
Linda Serra Hagedorn
University of Illinois

Patrick T. Terenzini
Pennsylvania State University

mailing address:
Ernest T. Pascarella
College of Education (m/c 147)
University of Illinois
1040 W. Harrison Street
Chicago, Illinois 60607-7133

HE028177

*This investigation was conducted as part of the National Study of Student Learning (NSSL) at the University of Illinois at Chicago. NSSL is supported by Grant No. R11G10037 from the US Department of Education to the National Center on Postsecondary Teaching, Learning, and Assessment (NCTLA).

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WHAT HAVE WE LEARNED FROM THE FIRST YEAR OF THE NATIONAL STUDY OF STUDENT LEARNING?

> "Student affairs professionals take seriously their responsibilities for fostering learning and personal development.... If learning is the primary measure of institutional productivity by which the quality of undergraduate education is determined, what and how much students learn also must be the criteria by which the value of student affairs is judged ...." (ACPA, p. 2, 1994).

This statement, taken from the 1994 American College Personnel Association publication, The Student Learning Imperative: Implications for Student Affairs (SLI), clearly underscores student learning and cognitive development during college as central concerns of student affairs professionals. Among other things, the SLI statement asserts student affairs divisions include experts on students and teaching and learning, and argues that student affairs policies and practices should be based on results of research on student learning, as well as institution-specific assessment data. As such, The Student Learning Imperative, developed and endorsed by a group of higher education leaders that included the president of the American College Personnel Association and the executive director of the National Association of Student Personnel Administrators, places student affairs at the center of postsecondary education's primary mission of facilitating student learning and intellectual growth.

Although the aims of The Student Learning Imperative include encouraging use of knowledge about student learning and intellectual growth in the development of student affairs

programs, two points remain problematic. First, student affairs journals do not publish a great deal of research and scholarship on student learning and so the required knowledge base may not be readily available in the field's literature (Kuh, Bean, Bradley, & Coomes, 1986). Second, the knowledge base itself has limitations. In their review of the literature on college impact, Pascarella and Terenzini (1991) pointed out there is still much to learn about collegiate influences on student learning and intellectual growth.

The National Study of Student Learning (NSSL), a three-year longitudinal research project begun in 1992 under the auspices of the National Center on Postsecondary Teaching Learning, and Assessment (NCTLA), is intended to expand knowledge about college impact by examining the influence of academic and nonacademic experiences on (a) student learning, (b) student attitudes about learning, (c) student cognitive development, and (d) student persistence. Also, the NSSL seeks to identify the extent to which academic and non-academic experiences differ by student and institutional characteristics. This paper summarizes some of the major findings to-date from the first year of the NSSL and discusses the implications of those results for higher education policy and practice.

METHOD

Institutional Sample

Eighteen four-year and five two-year postsecondary institutions participated in the study. Institutions were selected from the National Center on Education Statistics' Integrated Postsecondary Education Data System (IPEDS) data base to represent differences in colleges and universities nationwide on a variety of characteristics including institutional type and control (e.g., private and public research universities, private liberal arts colleges, public and private

comprehensive universities, two-year colleges, historically black colleges), size, geographic location, commuter or residential character, and the racial/ethnic distribution of the undergraduate student body. In the aggregate, the student population of the 23 participating institutions approximates the Fall, 1992 national population of undergraduates by ethnicity and gender.

Student Sample and Data Collection

The first set of data was collected in the Fall of 1992. Each of the 23 participating institutions was given a target sample size relative in magnitude to the size of its entering class, and students were to be sampled randomly from the population of new students entering each institution. The overall target sample was 5,000 students; the obtained sample (i.e., those students actually participating) for the Fall, 1992 data collection was 3,840 (76.8%).

The initial data collection lasted approximately three hours and included surveys of entering student characteristics and tests of academic proficiency. Students were advised that they were participating in a national, longitudinal study of student learning and would be paid a $25 stipend for their participation. They also were advised that the information they provided would be kept confidential and would never become part of their institutional records, and all that was expected of them was a good-faith effort on the cognitive test modules and a candid response to all questionnaire items.

A survey developed by NCTLA obtained information on student characteristics and background, as well as students' aspirations, expectations, and orientations toward learning as they entered college. Participants also completed Form 88A of the Collegiate Assessment of Academic Proficiency (CAAP). The CAAP was developed by the American College Testing Program (ACT) to assess general skills (e.g., writing, science reasoning, reading, mathematics)

typically acquired by students during the first two years of college (ACT, 1989). The total CAAP consists of five 40-minute, multiple-choice test modules. Three modules -- reading comprehension, mathematics, and critical thinking -- were administered to NSSL participants in Fall 1992. The internal consistency reliabilities for the three modules range from .79 to .86. Correlations between the modules and cumulative grade-point average are significant and positive, as are their relationships to similar measures, such as grades in related areas such as English and mathematics (ACT, 1991), and the Watson-Glaser Critical Thinking Appraisal (Bohr, Pascarella, Nora & Terenzini, in press).

Follow-up testing of the sample took place in the Spring of 1993. This data collection required about three and one-half hours and included the reading comprehension, mathematics, and critical thinking modules from Form 88B of the CAAP, Pace's (1984, 1987, 1990) College Student Experiences Questionnaire (CSEQ) to measure students' first-year experiences in college, and a follow-up assessment of aspects of students' first-year experiences and learning orientations not covered by the CSEQ. Students were paid a stipend of $35 for their participation in the second data collection. Of the 3,840 students who completed the Fall, 1992 testing, 2,685 participated in Spring, 1993 (69.9%).

Given the high response rates at both testings, it is not particularly surprising that the participants were reasonably representative of the population from which they were drawn. Nonetheless, the sample was weighted to adjust for potential response bias by gender, ethnicity, and institution. Based on the sampling plan that led to the selection of the 23 institutions in the study and the weighting of individual respondents within each institution, the weighted aggregate

sample of 2,685 students was reasonably representative, by gender and ethnicity, of the national population of first-year students entering higher education in the United States in the Fall of 1992.

Data Analysis

Various forms of least-squares regression analysis and analysis of covariance were the main data analysis procedures employed. These techniques permitted us to estimate the unique or net effects of independent variables of interest while statistically controlling for salient precollege and other potential confounding influences. That is, we used statistical procedures to isolate the effects of certain student experiences, such as type of institution attended, while taking differences among students, such as precollege ability, into account. Specific controls are described in each of the following sections on results.

RESULTS

Effects of Two-Year and Four-Year Colleges

Our first study compared the cognitive impacts of the first year in five two-year and six four-year colleges and universities matched on first-year student precollege ability (i.e., a composite of scores on the three precollege CAAP modules, reading comprehension, mathematics, and critical thinking). Influences of students' individual precollege ability (i.e., the appropriate CAAP module score), gender, ethnicity, socioeconomic origins, precollege academic motivation, age, credit-hours taken, residence on or off campus, work responsibilities, and the average precollege ability of the students attending each institution were controlled. We found no significant differences between two-year college students and their four-year college counterparts on end-of-first-year reading comprehension, mathematics, critical thinking, and composite

achievement (a combination of all three CAAP module scores) (Pascarella, Bohr, Nora, & Terenzini, in press).

Recent research on the occupational and economic consequences of where one begins postsecondary education suggests two-year colleges may be a cost-effective means to obtain the first two-years of college without sacrificing job market competitiveness in such areas as income or job status (Whitaker & Pascarella, 1994). The results of the first year of the National Study of Student Learning suggest further that students who begin college at a two-year institution also may not sacrifice intellectual gains. Our results indicate that, at least during the first year of attendance, the cognitive impacts of two-year colleges may be indistinguishable from those of four-year institutions that enroll similar students.

Effects of Historically-Black and Predominantly-White Colleges

In a second study we compared the cognitive effects on Black students of attendance at two historically Black colleges and sixteen predominantly White colleges. Statistical controls were used for individual precollege ability and academic motivation, gender, family social origins, age, credit-hours taken, campus residence, and the average precollege ability of the students attending each institution. Although differences between the groups were not statistically significant, there was general parity in reading comprehension, mathematics, critical thinking, and composite achievement between Black students attending historically Black colleges and Black students at predominantly White institutions. On three of the four outcome measures (reading comprehension, mathematics, and composite achievement), the statistically non-significant trends tended to favor Black students attending the two historically Black colleges (Bohr, Pascarella, Nora, & Terenzini, in press).

A long-standing critique of historically Black colleges asserts that these institutions may not provide an academic experience equal to that of many predominantly White institutions because of disadvantages in important educational resources such as libraries, laboratories, computer facilities, distinguished faculties, and academically well-prepared students (e.g., Bowles & DeCosta, 1971; Jencks & Reisman, 1968; Pascarella, Smart & Stoecker, 1989). At the same time, an impressive body of evidence suggests that historically Black colleges create comfortable campus climates that foster students' satisfaction, sense of community, and adjustment to college, and increase the likelihood of persistence and degree completion (e.g., Allen, 1986, 1987; Allen, Epps, & Haniff, 1991; Anderson, 1985; Pascarella, Smart, Ethington & Nettles, 1987; Pascarella, Smart & Stoecker, 1989; Thomas & Gordon, 1983). The NSSL results suggest further that these colleges also create social and psychological environments supportive of their students' intellectual development, despite possible limitations in educational resources..

These findings are also important for predominantly-White institutions that are concerned about the intellectual growth and achievement of their Black students. If supportive environments foster learning at Black colleges, how might similar climates for learning be fostered at White institutions? What should such environments include, and what obstacles exist to their development? Of course, the racial composition of historically Black colleges might be integral to the learning environments they create. Black colleges can, however, provide model programs and services to enhance student learning that might be transferable to White institutions. One example is the "ladder" of general science programs at Xavier University (LA), designed to implement high expectations for intellectual achievement while providing systematic structures for social, psychological, and academic support (Andreas, 1991; Kuh, Schuh, Whitt, & Associates, 1991).

Effects of Teacher Behaviors

In a third study, NSSL examined the extent to which teacher behaviors (i.e., teacher organization and preparation and teacher skill and clarity) influenced the development of general cognitive skills in the first year of college. These teacher behaviors have been identified in previous research as significant predictors of student course achievement (e.g., Cohen, 1981; Feldman, 1989, 1994). In our study, statistical procedures controlled for the influences of precollege cognitive ability and academic motivation, the average cognitive ability of the incoming class at each institution, ethnicity, gender, age, credit-hours taken, work responsibilities, and the pattern of courses taken. The extent to which students judged the overall instruction received during their first year of college as high in teacher organization and preparation had a significant positive association with end-of-first-year reading comprehension, mathematics, critical thinking, and composite achievement. That is, first-year students who perceived their instructors to be organized and prepared (e.g., "presentation of material is well organized," "class time is used effectively," and "course goals and requirements are clearly explained") tended to demonstrate greater cognitive gains than their peers who experienced less organized and prepared instruction (Pascarella, Edison, Nora, Hagedorn, & Braxton, 1995).

These results have at least two implications for higher education practitioners and policy makers. First, they suggest that the positive link between teacher organization/preparation and course achievement may extend to broad-based, general cognitive proficiencies. Second, and perhaps more important from a policy standpoint, effective teacher organization and preparation, such as those identified by the students in this study, are skills that can be taught -- and learned -- through purposeful teaching improvement efforts (Weimer, 1990).

Effects on First-Generation Students

A fourth study (Terenzini, Springer, Pascarella, & Nora, 1995) found that first-generation college students, when compared to their "traditional" peers, had lower precollege critical thinking abilities and were more likely to come from low income families, to be Hispanic, to have more dependent children, to have been encouraged by teachers (but not parents) to attend college, and to have lower degree aspirations. After controlling for these initial differences, first-generation students were also more likely to take technical and professional courses, to enroll for fewer hours in general, to attend orientation sessions, to work off campus, and to report positive relations with their peers and administrators. They were, however, more likely to perceive faculty members as being unconcerned with students and teaching and to report encountering instances of overt racial/ethnic discrimination.

The evidence also indicates that, despite the fact that first-generation students entered college with lower critical thinking skills than "traditional" students, the two groups gained in these abilities to about the same degree during the first year of college. These gains appear, however, to derive from different college experiences. In comparison to "traditional" students, first-generation students are more likely to benefit in their critical thinking from attendance at orientation sessions, use of the library, and attendance at a college with a climate that emphasizes being critical, evaluative, and analytical. Campuses that emphasize the development of vocational and occupational competencies have a negative effect on the critical thinking skills of both groups of students, but the negative influence is more pronounced among first-generation students.

These results indicate that extra efforts to get first-generation students to attend orientation activities may have special benefits for gains in critical thinking skills. Similarly,

because library experiences appear to be more important in promoting critical thinking in first-generation students than in traditional students, the former ought to be especially encouraged to take advantage of the library, as well as its orientation programs librarians to provide guidance and instruction in its use.

Finally, first-generation students appear to be less likely than their traditional peers to encounter a welcoming campus environment. First-generation students are more likely to perceive faculty members as unconcerned with teaching and with students as people, and first-generation students are more likely to report encountering instances of overt racial/ethnic discrimination. These findings imply that particular attention should be paid to the ways in which first-generation students are brought into the institution, and to efforts to ensure their fair treatment during their time as students.

Effects of Intercollegiate Athletic Participation

A fifth analysis of the NSSL data estimated the effects on first-year cognitive development of participation in intercollegiate athletics. Statistical controls were applied for precollege ability and academic motivation, the average ability of the incoming class at each institution, NCAA Division I or Non-Division I participation, ethnicity, age, credit hours taken, and campus residence. NSSL data revealed that male football and basketball players had significantly lower end-of-first-year reading comprehension and mathematics scores than male non-athletes, as well as male athletes in intercollegiate sports other than football and basketball. The differences between male non-athletes and male athletes in sports other than football and basketball were small and non-significant.

When we controlled for the same potentially confounding influences, women intercollegiate athletes showed significantly less first-year development in reading comprehension than their non-athlete counterparts. The two groups were essentially the same in mathematics and critical thinking (Pascarella, Bohr, Nora, & Terenzini, in press). Further analysis indicated that the impact of athletic participation on first-year reading comprehension was not the same for all women. Rather, the largest reading comprehension disadvantages accrued to those women athletes who began college with the lowest levels of reading comprehension. As the level of precollege reading comprehension increased, the magnitude of the disadvantage for women athletes, relative to their non-athlete counterparts, tended to decrease. Thus, the cognitive impediments linked with athletic participation were not the same for all women athletes, but rather were most pronounced for women athletes who were at the greatest disadvantage as they entered college.

The apparent learning disadvantages accruing to males who play intercollegiate football and basketball, and to female intercollegiate athletes with low precollege reading skills, suggest that any steps taken to ameliorate these negative consequences need to be taken early in these students' collegiate careers. The significant negative influences of athletics for these groups were detectable after only one year of intercollegiate athletic participation. A growing body of evidence (e.g., Pascarella, Brier, Smart, & Herzog, 1987; Walberg & Tsai, 1983) suggests that these one-year differences may well be the first stage in a process that produces a serious cumulative disadvantage, one that is likely to grow worse over time.

Influences on, and Consequences of, Openness to Diversity and Challenge

A sixth analysis examined the extent to which students' development of openness to cultural/racial diversity and challenge during the first year of college was influenced by measures of the institutional environment, students' academic experiences, and their social/non-academic experiences. The scale measuring students' openness to diversity/challenge was an eight-item, Likert-type measure with internal consistency reliabilities of .83 for the precollege scale and .84 for the end-of-first-year scale. Diversity/challenge scale items included "I enjoy having discussions with people whose ideas and values are different from my own," "Learning about people from different cultures is a very important part of my college education," "I enjoy taking courses that challenge my beliefs and values," "The courses I enjoy most are those that make me think about things from a difference perspective," and "Contact with individuals whose background (e.g., race, national origin, sexual orientation) is different from my own is an essential part of my college education."

Statistical controls were used for precollege openness to diversity/challenge, academic ability, academic motivation, coursework patterns, and other potentially confounding influences. Data analysis revealed a number of variables that had significant, net positive effects on end-of-first-year openness to diversity/challenge. These variables included: a non-discriminatory racial environment at the institution attended, on-campus residence, participation in a racial or cultural awareness workshop, and extent of involvement with diverse student peers. Greek affiliation had a significant negative effect on openness to challenge and diversity for both men and women. Additional analyses indicates that the positive effects on openness to diversity/challenge of living on-campus and participating in a racial or cultural awareness workshop were stronger for White

students than students of color. Conversely, Greek affiliation had a stronger negative effect on openness to diversity and challenge for both White men and women than it did for students of color (Pascarella, Edison, Nora, & Terenzini, 1994).

A related NSSL study (Springer, Terenzini, Pascarella, & Nora, 1995) examined how initial level of openness to diversity shaped students' associations with socially diverse peers, as well as the frequency of students' discussions of substantive issues related to ethnic, racial, or cultural diversity. As a group, White students at the end of the first year of college perceived significantly less campus prejudice against ethnic minority students than did African-American, Asian-American, or Hispanic students. However, White students who were initially more open to diversity were more likely to have culturally diverse student acquaintances and to discuss issues of race, ethnicity, or culture more frequently than those with less initial openness to diversity. These experiences each exerted significant and positive direct effects on White students' perceptions of prejudice against minority students on campus. White students who were more open to diversity as they began college had, at the end of the first year, perceptions of prejudice against minority students similar to the perceptions of students of color. Thus, White students' initial openness to diversity directly affected their perceptions of prejudice as well as indirectly affecting their perceptions through their peer associations and frequency of discussions about diversity.

These results have several implications for higher education practitioners. First, they tend to support Astin's (1993) contention that the student's peer group is a particularly potent source of influence on growth and development during the undergraduate years. Students who were involved with peers different from themselves demonstrated growth in openness to diversity and challenge and were more likely to perceive the racial climate on their campus in ways that were

congruent with those of students of color. Knowledge of the importance of peer influence on student learning can, therefore, influence a broad range of institutional policies and practices (e.g., orientation programs, housing assignments and programs, work study programs, Greek system policies, and collaborative learning settings) intended to bring White students into more frequent and educationally purposeful contact with racially, ethnically, and culturally diverse peers.

Second, the findings have implications for institutional policies aimed at enhancing students' acceptance and appreciation of diversity. For example, these studies indicate that racial or cultural awareness workshops can foster students' openness to cultural, racial and value diversity. The finding that openness to diversity and challenge was positively influenced by a non-discriminatory racial environment suggests that institutions can facilitate students' growth on this dimension through policies and programs that teach faculty, administrators, and students about what constitutes racial discrimination and demonstrate unequivocally that racism and intolerance for diversity are anathema to the institutional ethos and mission.

Cognitive Effects of Greek Affiliation

The NSSL also examined the cognitive effects of Greek affiliation during the first year of college. Statistical controls were made for individual precollege ability and academic motivation, gender, ethnicity, age, credit hours taken, work responsibilities, campus residence, patterns of coursework taken, and the average cognitive ability of the incoming class at each institution. Data revealed that men who were members of fraternities had significantly lower end-of-first-year reading comprehension, mathematics, critical thinking, and composite achievement than their peers who were not affiliated with a Greek organization. First-year fraternity membership had the largest negative effect on critical thinking. By the end of their first year of college, men in

fraternities had, on average, a disadvantage of 10.64 percentile points in critical thinking when compared to their non-Greek peers.

Additional analyses revealed that, for men, ethnicity influenced the cognitive effects of Greek affiliation. Joining a fraternity had a strong negative effect on all four cognitive outcomes for White men, but a modest positive influence on all four cognitive outcomes for men of color (Pascarella, Nora, Edison, Hagedorn, & Terenzini, 1994). What the data cannot tell us, however, is whether the fraternities to which the NSSL students belonged were predominantly White, predominantly of color, or both.

Analysis of data for women indicated that joining a sorority during the first year of college also had a negative effect on cognitive development. However, only the negative effects for reading comprehension and composite achievement were statistically significant. The overall magnitude of the negative cognitive influences of Greek membership tended to be smaller for women than for men.

The results of these analyses tend to reinforce findings of previous research. Pike and Askew (1990), for example, in their single-institution study, found negative effects of Greek membership on the cognitive development of college seniors. The NSSL data indicate, however, that the negative cognitive effects of Greek affiliation might be discernible as early as the end of the first year of college. This finding prompts questions about policies on the timing of Greek membership, suggesting, perhaps, that Rush and new-member activities, especially for White men, be deferred to the second semester -- or even the second year -- of college.

Our findings also suggest that, although fraternities and sororities can "provide unusually rich out-of-class learning and personal development opportunities for undergraduates," (Kuh &

Lyons, 1990, p. 20), normative peer cultures and practices of Greek life can be inconsistent with the educational and intellectual missions of colleges and universities. Therefore, we encourage administrators and faculty to "compare the purposes and practices of Greek organizations with their institutions' mission and philosophy to determine whether they are compatible" (Kuh & Lyons, 1990, p. 27). Evidence of lack of compatibility should lead to an examination of the role of Greek life in the institution -- indeed, a restructuring of those policies and practices.

Multiple Influences On Critical Thinking

A final analysis of the NSSL data was conducted to determine the influence of in-class and out-of-class experiences-- together and separately -- on first-year students' critical thinking. Statistical procedures controlled for the effects of students' initial level of critical thinking, degree aspirations, age, gender, ethnicity and social origins, as well as institutional characteristics such as form of control (private or public), type (two- or four-year), and several measures of environmental emphasis (e.g., analytical, scholarly, esthetic). Both in-class and out-of-class experiences had small, but statistically significant and unique, positive effects on changes in critical thinking during the first year in college (Terenzini, Springer, Pascarella & Nora, 1994). In fact, out-of-class-experiences were somewhat more important to the development of critical thinking than in-class experiences.

The in-class/instructional variables significantly and positively associated with end-of-first-year critical thinking were the number of courses taken in the humanities and fine arts and the natural sciences and engineering, as well as the total number of credit hours completed in the first year. Significant out-of-class experiences were student involvement in clubs and organizations,

participation in a racial/cultural awareness workshop, and student perceptions of faculty concern for student development.

These results highlight the centrality of out-of-class experiences to student learning in college (Astin, 1993; Baxter Magolda, 1992) and reinforce the assertion with which we began this article: that student affairs professionals and student affairs programs play a major role in student learning and cognitive development during college. We further suggest these results argue for rethinking the current structural and functional relationships between academic and student affairs divisions in our colleges and universities. If students develop intellectually as a consequence of an interconnected and holistic set of academic and out-of-class influences on campus, then our administrative structures, program planning and implementation should be similarly interconnected and collaborative.

SUMMARY

What have we learned from the first year of the National Study of Student Learning? First, the findings from NSSL's first year indicate that some widely-accepted perceptions of the quality of the academic experiences offered by two-year and historically black institutions (HBCU) should be questioned. Many people in higher education and the public at large believe that two-year and historically black institutions offer educational experiences academically inferior to those available at four-year or predominantly white colleges and universities. NSSL data indicate those beliefs may lack empirical support. After controlling for a variety of entering student characteristics, including levels of precollege critical thinking, reading, and math, two-year students showed gains in these cognitive areas comparable to those of students who entered four-year institutions. Also, after applying similar statistical controls, we found no differences in gains

in critical thinking, reading comprehension, or math skills between Black students who completed their first year of college at HBCUs and Black students who spent their first year at a predominantly White institution. Both findings suggest the need to re-examine current policies and practices affecting the allocation of resources to two- and four-year institutions in the public sector, as well as the level of public and private support provided to historically Black institutions.

Second, NSSL evidence indicates that the degree of instructors' organization and preparation for classes may be linked not only to general academic achievement, but also to the development of higher order academic and cognitive skills. These instructional skills can be taught to, and learned by, faculty members through purposeful instructional improvement activities.

Third, the NSSL analyses identify student experiences and campus interventions that affect student learning and development in a variety of ways -- some beneficial, some deleterious. Students' participation in a racial or cultural awareness workshop, residence on campus, perceptions of a non-discriminatory racial environment at the institution attended, and interpersonal contact and involvement with diverse peers were significantly, positively, and uniquely related to gains in openness to cultural/racial diversity and challenge. These findings underscore the important role students' peers play in an institution's overall educational impact. Ways must be found to systematically incorporate this source of influence in educational programs and policies.

But not all college experiences have positive effects on student learning. First-year participation in a social sorority or fraternity (especially a fraternity) and participation in men's intercollegiate football and basketball (and women's basketball for players with low cognitive

skills as they enter college) had negative influences on students' development of higher order academic and cognitive skills. Also, Greek participation (for White men and women) had a statistically significant negative influence on changes in openness to racial/cultural diversity and challenge. Given that all these negative effects were identifiable after only one year of college, and the likelihood (based on other evidence) that these differences are likely to increase rather than diminish over time, our findings raise questions about the wisdom of institutional policies that permit first-year students to participate in these activities.

The NSSL evidence that these college influences appear to be specific to student sub-groups with certain characteristics (e.g., gender, race/ethnicity, first-generation student status) emphasizes the need for institutional programming and interventions that are sensitive to student differences. Pascarella and Terenzini (1991) suggested that more lip-service than serious attention is given to individual student differences in our colleges and universities, and the NSSL findings summarized here indicate the importance of paying closer attention to such differences.

Finally, NSSL findings highlight the interconnected, even overlapping, influence of students' college experiences as they shape student learning. Taken together, these analyses point to a wide variety of curricular, instructional, out-of-class, and organizational climate variables that affect how students learn and grow. This finding indicates a need to blur the boundaries between "academic" and "student" affairs. It is clear from this and other studies (see Pascarella & Terenzini, 1991) that students develop in much more holistic and integrated ways than are reflected in our organizational structures, attitudes, and behaviors. The evidence suggests a need for greater cooperation and collaboration among organizational units within and across academic and student affairs.

LIMITATIONS

The NSSL data have several limitations that should be kept in mind when interpreting the findings. First, although the overall sample is multiinstitutional and consists of a broad range of two- and four-year institutions form 16 states throughout the country, the fact that the analyses were limited to 5 two-year and 18 four-year colleges means that we cannot necessarily generalize the results to all two- and four-year institutions in the United States. Similarly, although attempts were made in the initial sampling design and subsequent sample weighting to make the sample as representative as possible at each institution, the time commitment and work required of each student participant undoubtedly led to some self-selection. We cannot be sure that those who were willing to participate in the study responded in the same way as would those who were invited but declined to participate. Third, our measures of cognitive development were limited to reading comprehension, mathematics, and critical thinking. While these are important dimensions of cognitive development, they are certainly not the only way in which the concept of cognitive or intellectual development can be operationally defined. Alternative conceptualizations or operational definitions of the dependent measures might have yielded findings different from those produced by the NSSL analyses. Finally, the NSSL analyses conducted so far are limited by the fact that we have only traced the sample over the first year of college. We cannot be sure that the results we report would hold for subsequent years in college.

CONCLUSION

Despite its limitations, the National Study of Student Learning provides an important resource for higher education professionals concerned with student learning and cognitive development in college. We know of no other data base that contains such in-depth measures of

student learning and cognitive development on a sample of students from such diverse two-year and four-year institutions. Future analyses will address the development of students' science reasoning and writing skills after two years of college, and will revisit the development of critical thinking and reading comprehension at the end of the second and third years of college. These analyses, along with the findings reviewed in this paper, will contribute to a research base upon which student affairs professionals can develop policies and programs to promote student learning.

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